



MPF(F)

R&D



MPF(F) Cargo Operations R&D

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***Authors: Martin Fink, Arthur Rausch, Amber Huffman,
Robert Evans, Richard Kelly***



Introduction



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- Maritime Prepositioning Force Future (MPF(F)) is one enabler of the transformational seabasing concept
 - Ships will be required to project and sustain forces ashore while at sea
 - Robust cargo system required to project and sustain:
 - Personnel
 - Vehicles
 - ISO Containers
 - Pallet Sized Cargo
 - Three key risk areas identified:
 - Lighterage interface for RO/RO cargo
 - Cargo transfer between MPF(F) and sealift resupply ships
 - Internal handling of cargo containers or pallets and vehicles
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Current Lighterage Interface



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- Transfer Personnel/Vehicles/Cargo using Roll On/Roll Off Discharge Facility (RRDF)
- Each module is deployed by shipboard cranes and connected after deployment
- Process is time consuming and operations must be conducted in calm seas





Lighterage Interface



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- Key element of integral lighterage interface with surface craft is the Integrated Landing Platform (ILP)
 - ILP is an organic, self-deploying floating platform
 - ILP R&D effort designed as a series of incremental analysis and demonstration efforts
 - Efforts designed to provide spiral of analysis and full scale test results to reduce risk and demonstrate higher sea states
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ILP Model Tests

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- Model tests conducted late September and early October 03
- Model test measured motions and forces of ILP along side model. Test Matrix included:
 - Random seas in SS 3, 4, and 5
 - A range of headings with ILP on windward and leeward side
 - Sea swells 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100
- Test results show that the ILP motions in lee of ship.





ILP Model Test Video



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Heading Comparisons

Sea State 5

Stbd Bow Quartering Seas

135 degrees

vs

Sea State 5

Port Stern Quartering Seas

315 degrees



ILP FY04 Concept Demo

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- Demo conducted 9 – 19 August 2004
 - Two Primary Objectives:
 - Demonstrate LCAC interface with platform floating against the side of a ship in calm conditions
 - Demonstrate the ability to lift a platform suitable for LCAC interface using organic ship equipment
 - Both objectives met
 - Multiple LCAC fly-ons over multiple days with multiple operators
 - Multiple lifts of platform to simulated stowed position vertically alongside the ship
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ILP Concept Demo Video



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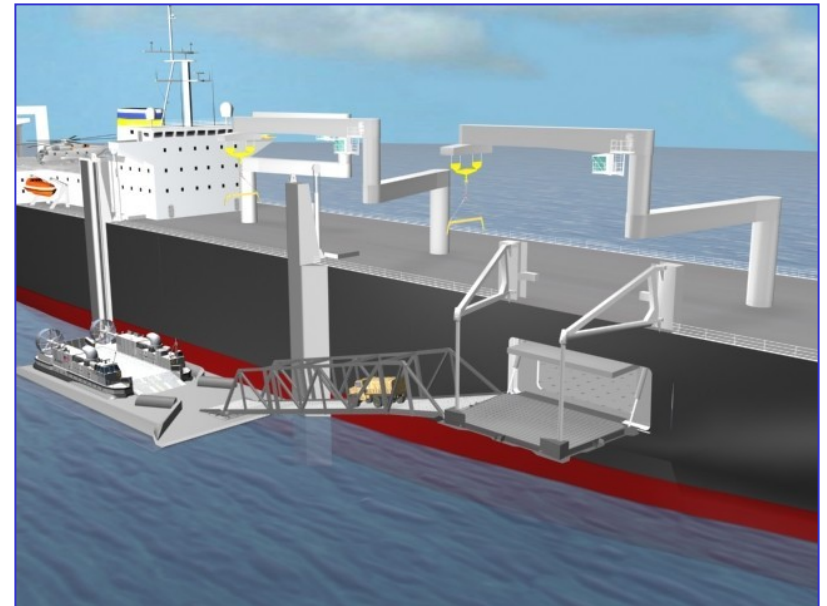




Future ILP Efforts/Demos

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- Design and build a demo platform for future demos
- Design a coupling/lifting system for future demos
- Conduct demos
 - LCAC fly-on in rougher waters
 - Higher sea states with instrumented platform moored to ship
 - RO/RO ops to platform





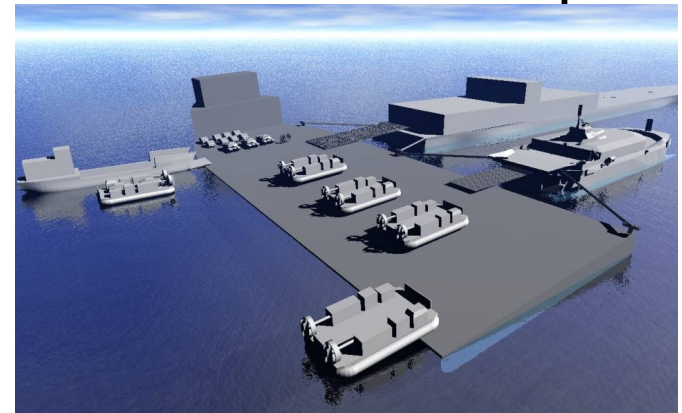
MLP (Mobile Landing Platform)

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- Concept uses a heavy lift ship as a supplement/ replacement to the ILP
- CARDEROCK Center for Innovative Ship Design (CISD) developed a similar effort called the Intermediate Transfer Station (ITS)
 - Uses a stern “Med Moor” configuration
- Conduct tiered demonstrations of MLP concept



Skin to Skin Configuration



Med Moor Configuration



Ship to Ship Cargo Transfer



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- Commercial containerships expected to be used to supply MPF(F) in the sea base
 - Bringing ships close together, skin to skin, enables transfer of ISO containers and vehicles
 - The skin to skin evolution done by tankers on a day to day basis in relatively high seas
 - Sea state 5-6
 - Mooring and fendering and advanced crane systems will be required
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Skin to Skin Demo

MPF(F) R&D

- Tests were conducted week of 29 Sep 03 at mouth of Chesapeake Bay
- Preliminary Lessons Learned:
 - At-sea mooring achievable with cargo ships
 - Commercial tanker mooring procedures will need adaptation for application to high freeboard, low GM cargo ships
 - Sea swell can have significant effect on ship motions
 - Ships must have appropriate mooring configurations to be suitable for skin-to-skin mooring.





Skin to Skin Demo Video



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Current and Future Efforts



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- In conjunction with MSC, 11 ships were visited as candidates for future skin to skin demos
 - Leveraging ONR Expeditionary Logistics Future Naval Capability (ExLog) to develop an advanced simulator that can model close-in hull interactions
 - Investigating alternate mooring system technologies and arrangements
 - Leveraging other ExLog technology developments
 - Conduct a tiered demonstration strategy
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Internal Cargo Handling



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- A basic function of sea base will be to sustain operations ashore without need for on-shore logistics footprint
 - Rapid, flexible logistics supply to warfighter will likely require tailored packages from a robust selective offload system
 - Requirements for cargo types and throughput rates have not yet been defined
 - Assume cargo comes on board as ISO containers or pallet sized loads
 - Assume cargo will be projected as pallet sized loads
 - Ship appears to have two primary modes of operation:
 - Initial projection of vehicles and troops
 - Long term sustainment
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Automated Cargo Handling

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- Developed industry survey and automation assessment studies
 - Working with ExLog team for cargo handling
 - Conducted site visits of representative cargo handling and movement systems
 - Visits included the Joint Modular Intermodal Container (JMIC) development team
 - Packaging size standardization is critical to automation
 - Future testing on land, pierside, and at sea will be conducted to show increasing integration between cargo handling systems
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Conclusion



MPF(F) R&D

- MPF(F) program will invest in a structured R&D program
 - R&D program is focused on risk reduction
 - The goal of each of the three R&D focus areas is to conduct a tiered development and demonstration program
 - Prototypes will be developed and tested under progressively more rigorous conditions
 - This will enhance preparation of MPF(F) acquisition specification
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